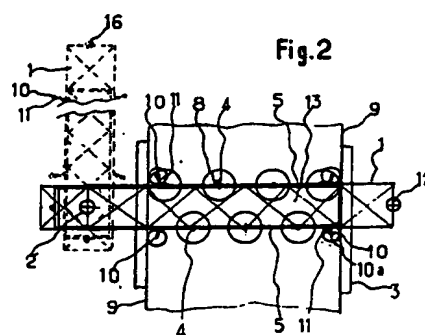


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(54) **Process and device for continuous spraying of additives on permeable products in a strip as they move**

(57) The invention relates to a process and device in accordance with the said process for continuous spraying of additives such as starch milk on permeable products in a strip such as paper as they move consisting of spraying the additives at different stages of dryness of the forming strip by means of one or several spray ramps (13) each supported by a support frame (1) rotating in relation to a column (2) placed on one side of the forming belt (3), each ramp (13) being composed of two pipes (5) feeding the additives under pressure each fitted with spray nozzles (4) distributed in geometric arrangements so that the surface of the product in a strip receives an equal quantity of additives, near to the edges (9) of the products in a strip, each pipe (5) is equipped with an adjustable spray nozzle (10) integral with a fixed or movable pipe (11) so as to diffuse an additional quantity of additives with regard to the said edges (9) in order to compensate for edge defects.



Process and device for the continuous spraying of additives on permeable products in a strip as they move

The present process relates to a process and device in accordance with the said process, for continuous spraying of additives on permeable products in a strip as they move such as paper, fabric etc.

In the paper industry, for example, it is known that to reinforce and adapt certain properties of the paper for specific uses, various additives of mineral, vegetable or synthetic origin are added, these additions of additives are carried out in different ways, in particular as a mass by introducing the additive into the paper pulp before manufacture of the sheet, on the surface by spreading the additive on the dry sheet as it passes between two press rolls or by coating consisting of spreading on the surface of the dry sheet a solution containing the additive. Application to the surface by spraying the additive such as starch milk described in patent FR 1 407 510 by means of a single ramp placed transversely in the direction of movement of the paper on which are arranged at given intervals sprayers designed to discharge in the form of mist the starch milk contained in a tank equipped with a stirrer enabling homogenisation of the starch and the water, the said milk by means of a pump and piping equipped with filters is directed under pressure towards the sprayers, the said pressure being controlled by means of pressure gauges and valves allowing the flowrate to be controlled as required.

This type of device has different disadvantages, particularly with regard to the position of the single ramp in relation to the paper sheet and with regard to its variable dryness depending on the types of paper manufactured, the said ramp being longitudinally movable or fixed does not allow optimisation of the retention and distribution of the granules of starch in the thickness of the sheet, this being due to the fact of the constant distance of the nozzles from the ramp in relation to the paper sheet in production whatever the different types of paper manufactured which have different abilities for internal migration of the granules depending principally on the thickness and dryness of the sheet at the base of the said ramp, it is practically impossible to saturate through the thickness the said sheet because either the starch granules are concentrated preferably in the surface area called the felt surface, or penetrate unequally the thickness of the paper according to the preferred areas, or the said starch granules are drawn towards the lower surface called the nap and a large part of which is removed in

the drainage water, on the other hand it does not allow any edge faults to be remedied, where it is not necessary to spray starch, the fixed point ramp causes with condensation the formation of drops falling on the paper sheet forming causing faults in the formation of the sheet, in particular called "a look-through" hence weaknesses in the sheet and therefore preferred break points, taking into account the fixed position of the ramp this latter does not contribute towards optimising stop times to change the forming fabric for example.

The aim of the process and device which are the object of the invention is to offset the disadvantages described above.

The process and device which are the object of the invention are characterised in that the process consists of spraying the starch milk continuously and in successive layers at different stages of dryness of the paper sheet forming so as to saturate with granules the thickness of the sheet by means of the device which comprises spray ramps held in position in the transverse direction of the forming table of the paper sheet each by means of a rotating support frame the height of which can be adjusted and moved along the forming table, each spray ramp being comprised of two pipes fed in series or parallel under pressure with homogenised starch milk in a tank, the said pipes being fitted with spray nozzles distributed at given intervals in geometric arrangements, such as staggered, so that the surface of the paper receives an equal quantity of starch granules as it moves, at each end and near the edges of the paper sheets, each pipe is equipped with an independent adjustable spray nozzle integral with a secondary pipe so as to diffuse an additional quantity of starch granules with regard to the said edges of the paper sheets.

Other characteristics and advantages of the invention will be shown more clearly in the description which follows in regard to the attached drawings given by way of non-limiting example where:

- Figure 1 is a front view of a spray ramp
- Figure 2 a plan view of a spray ramp
- Figure 3 a plan view of a production variation of a ramp
- Figure 4 a series of ramps distributed with regard to the progressive drainage station.

As shown [in] figures 1 and 2, a continuous spray device comprises a support frame 1 rotating in relation to the column 2 arranged on one side of the forming belt 3 of the paper sheet, the said column 2 being movable in the

longitudinal direction of the said belt 3 and the said frame 1 is adjustable in height so that depending on the specific conditions of dryness and penetration of the starch granules the positioning of the ramp 13 can be adjusted both in the longitudinal direction of the belt and vertically the distance of the spray nozzles 4 in relation to the paper sheet forming, the said nozzles being distributed in accordance with a given interval on the two pipes 5 comprising the ramp 13 feeding the starch milk under pressure, controlled, adjusted and filtered in a known way by means of at least one pump 14, the said starch milk being previously homogenised in a tank 6 equipped with a stirrer 7.

The spray nozzles 4 on the two pipes 5 comprising a ramp 13 are distributed in a geometric arrangement such as staggered and this so as to complete distribution of the starch granules on the paper sheet during projection of the mist of starch milk.

In order to adapt the spray device to all types of paper quality sought, each spray nozzle 4 is equipped with a stop valve 8 allowing them to be used or not according to their adjustment in height in relation to the said paper sheet.

In order to carry out distribution of the starch granules on the edges 9 of the paper sheet, at each end of the pipes 5 and near to the said edges 9 is added an adjustable independent nozzle 10 equipped with a stop valve 10a is added, the said nozzles 10 are integral with a fixed or movable pipe 11 connected to each pipe 5, the direction of each nozzle 10 and pipe 11 is such that it allows spraying to be carried out according to the width of the paper sheet.

It follows that the pipes 5 can be fed under pressure with starch milk in series or in parallel.

When the spray device is placed in the transverse direction of the forming belt 3 of the paper sheet, the frames 1 at the opposite end of the columns 2 are each immobilised at the selected height on a column 12 by all known appropriate means, the same applies when one of the ramps is not used and it is arranged parallel to the forming belt of the paper sheet, it is immobilised on a column 16.

According to the variation represented [in] figure 3, a spray device can comprise a series of ramps 13 supported by a common frame 15 having the same characteristics as the frame 1 in particular adjustable in height for distribution of spraying, rotating to arrange the belt 3 during non-use or to

change the said belt 3 and movable in the longitudinal direction of the belt 3.

Depending on the varieties of paper to be obtained and as shown [in] figure 4, the ramps 13 are distributed along the drainage table and this so as to saturate the sheet through the thickness by successive layers of granules of starch depending on its change of dryness, the ramps 13 being arranged as required at a regular or irregular distance between them.

Claims

1*) Process for continuous spraying of additives such as starch milk on permeable products in a strip, such as paper or fabric, as they move, characterised in that it consists of spraying starch milk continuously at different stages of dryness of the strip forming by means of spray ramps so as to saturate with granules the thickness of the strip by successive layers with regard to the drainage station.

2*) Device for continuous spraying of additives such as starch milk on permeable products in a strip, paper or fabric, as they move, characterised in that it comprises spray ramps (13) distributed along the drainage table, each ramp being composed of two pipes (5) fitted with spray nozzles (4, 10), each ramp (13) being maintained by means of a support frame (9) rotating in relation to a column (2) placed on one side of the product support forming belt (3), the said frame (1) being adjustable in height in relation to the said belt (3) and movable in the longitudinal direction of the said belt (3), the nozzles (4) being distributed on the pipes (5) in a given geometric arrangement and interval and the nozzles (10) placed at the ends of each pipe (5) near the edges (9) of the products in a strip.

3*) Spray device according to claim 2, characterised in that the spray nozzles (4) are distributed on the pipes (5) in a geometric arrangement such as staggered.

4*) Spray device according to claim 2, characterised in that the nozzles (10) at the ends of the pipes (5) near the edges (9) of the products in a strip are adjustable and independent (10) and equipped with a stop valve (10a).

5*) Spray device according to claim 4, characterised in that the adjustable nozzles (10) are integral with a fixed or movable pipe (11) connected to each of the pipes (5).

6*) Spray device according to claim 2, characterised in that during positioning of the spray ramps (13) in the transverse direction of the belt (3) the end of the frame (1) of each of the said ramps is held and immobilised at the selected height on a column (12) placed at the other end of the belt (3) during the non-use of a ramp (13), the frame is placed parallel to the belt (3), its end opposite the column (2) resting on a column (16).

7*) Spray device according to claim 2, characterised in that one or several series of ramps (13) are supported by a common rotating frame (15)

adjustable in height and movable in the longitudinal direction of the belt (3), having the same characteristics as the frame (1).

- 5 8*) Spray device according to claim 2, characterised in that the ramps (13) are distributed as required along the drainage table so as to optimise saturation through the thickness of the sheet by successive layers of product depending on the change in its dryness and the specific penetration conditions of the starch granules through the said thickness of the said paper sheet, the said ramps (13) being arranged as required at a regular or irregular distance.

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EUROPEAN SEARCH REPORT

Application number

EP 88 45 0039

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where necessary, of the relevant parts	Relevant claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 5)
A	J.P. CASEY: "Pulp and Paper. Chemistry and Chemical Technology", edition 3, vol. III, 1981, pages 1678, 1679, John Wiley & Sons, New York, US * Page 1678, last two lines *	1	D 21 H 23/26 D 21 H 23/50 D 06 B 1/02 // D 21 H 17:28
D,A	FR-A-1 407 510 (BECKER & CO.) * Figure 1: abstract, points 1,3,4,10,13; page 3, right column, lines 5,8; page 4, left column, line 1 *	1,2	
A	BE-A- 403 483 (ORION MASCHINEN- UND APPARATEBAU) * Figures 1,2; claim 1 *	2,3,8	
A	US-A-2 118 212 (J.D. MacLAURIN) * Figures 1-4, 13; page 1, left column, line 53 – right column, line 49; page 2, left column, line 24 – page 3, right column, line 23; page 5, right column, line 32 – page 6, line 72 *	2,8	
A	US-A-1 686 818 (L. KIRSCHBRAUN) * Figures 1,2; page 1, lines 64 – 105 *	2,3	
A	US-A-2 112 540 (F.J. McANDREWS et al.) * Figures 1,2; page 2, left column, line 64 – page 4, left column, line 51 *	2	
A	FR-A-1 431 502 (SOCIETE FRANCAISE DES SILICATES SPECIAUX SIFRANCE)		
A	US-A-2 756 647 (L.P. THOMPSON)		
The present report has been drawn up for all claims			
Place of search LA HAYE		Date search completed 27-06-1989	Examiner NESTBY K.
CATEGORY OF DOCUMENTS CITED X: of particular relevance to it alone Y: of particular relevance in combination with another document in the same category A: technological background O: non-written disclosure P: insert document		T: theory or principle on which the invention is based E: patent document having a date prior to the filing date and which was only published on that filing date or a later date D: cited in the application L: cited for other reasons &: member of the same family, corresponding document	